

GE
SMART
ASIA 2018



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WHEN

9 – 11 APRIL 2018

WHERE

ADELAIDE, AUSTRALIA

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3D Data Management for Smart Cities: Challenge and Opportunity

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Smart City Challenge: Integrating Disparate IT Systems

- Public Spaces
- Smart Grid, Smart Water, etc.
- Intelligent Buildings
- Adaptive Traffic Control
- Public Safety and Security
- Environmental Monitoring
- Emergency Services
- Health
- Urban Planning
- Open Data

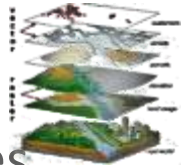
Smart City Data Requirements

Data Sources

- Paper-based



- Multiple GIS



- Multiple Databases



- Mobile, Web Based and Crowd sourced



- Sensors

- Geo-referenced Video, 3D, LiDAR



Modern Platform

- Modern Big Data Technologies
- Simplified Technology Infrastructure
- Powerful Analytic Capabilities
- On Premise, In Cloud or Hybrid
- Shared Access
- Future Proof

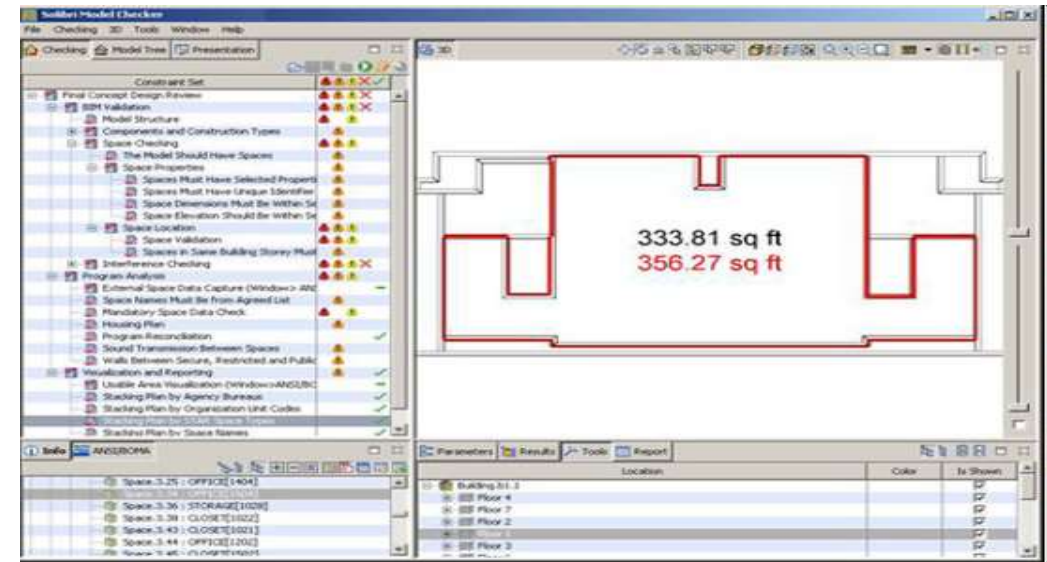
Point Clouds: LIDAR

- Large volumes of point data acquired by sensors
 - LIDAR (*Light Detection and Ranging*)
 - Seismic sensors
- Millions of points used to model a scene
- New data type introduced to efficiently manage this type of point data
- TIN to create triangulation of such points

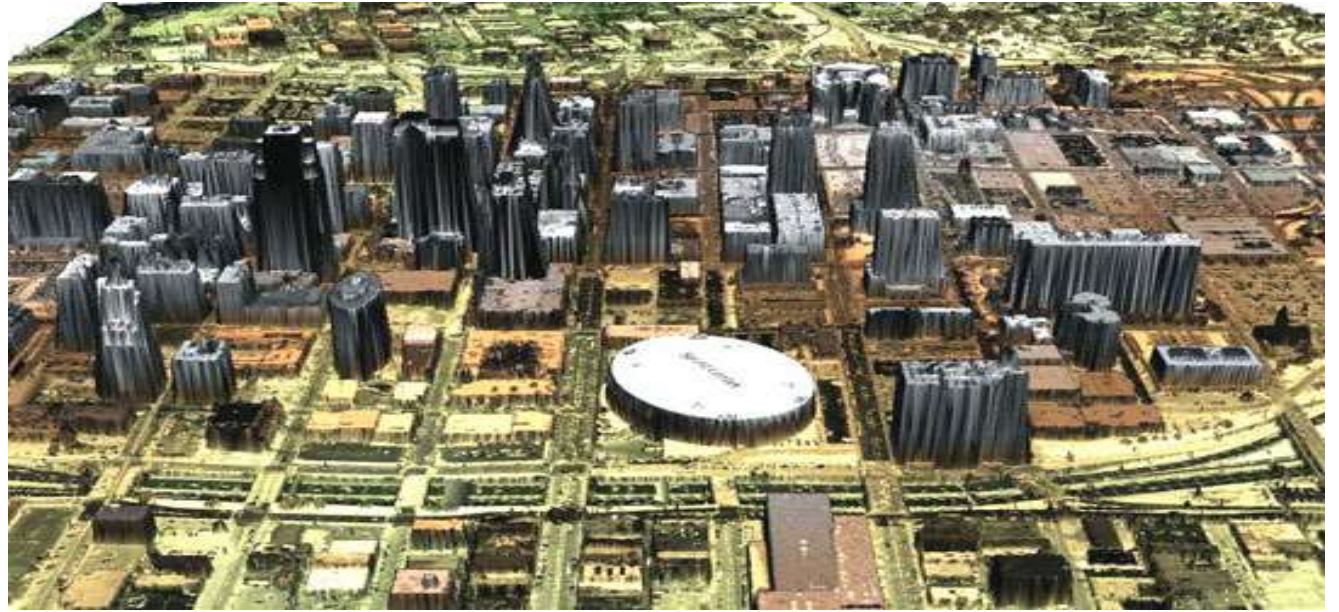


Building Information Modeling (BIM):

From Design to Operations



3D City Models (CityGML)



Use Cases

City of Berlin – 3D City Model

Implemented by TU Berlin

- 550000 buildings, reconstructed from 2D cadastre and LIDAR data
- Textures extracted from oblique aerial photography
- Stored in 3DCityDB
- 2012 Oracle Spatial Excellence Award



Images courtesy of: TU Berlin, Institute for Geodesy and Geoinformation

Transport for London – Traffic Directorate Data Service, UK

Service updates at 22:36

Now Later This weekend

Bakerloo	Good service
Central	Good service
Circle	Good service
District	Good service
DLR	Good service
H'smith & City	Good service
Jubilee	Good service
Metropolitan	Good service
Northern	Good service
Overground	Good service
Piccadilly	Good service
Victoria	Good service
Waterloo & City	Good service

► Buses ► Roads ► River



Data feeds

Other feeds available now

- London Underground passenger counts data
- Live roadside message signs
- Barclays Cycle Hire docking stations
- Live traffic camera images
- Rolling Origin & Destination Surveys
- Predicted wait times at stations during the Games
- Games postcode data
- Journey planner API data
- Oyster card journey information

► [See our full list of feeds](#)

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New York City, USA



City Service

Quick & easy Multi Channel access to City Services and Info



City Operation

Citywide Performance Reporting measures/compares 40+ agencies



City Infrastructure

Spatial Open Data Repository for transparency & accountability

Citizen Empowerment

Citizen sourced applications empower the community



Sfpark - San Francisco, USA



City Operation

Business Intelligence demand driven pricing of parkingspaces



City Infrastructure

Loading sensor data on parking availability, payments, bus arrivals

Citizen Empowerment

Less traffic, fewer citations, guides drivers to parking lots and bus



Business Productivity

3rd party service providers enhance real time parking data



Sustainable City

Streets less congested, less violations less smog and safer



Istanbul Municipality

- **Diverse Transport Modes**

- Buses
- Tramways
- Metro
- Trains

- **But also**

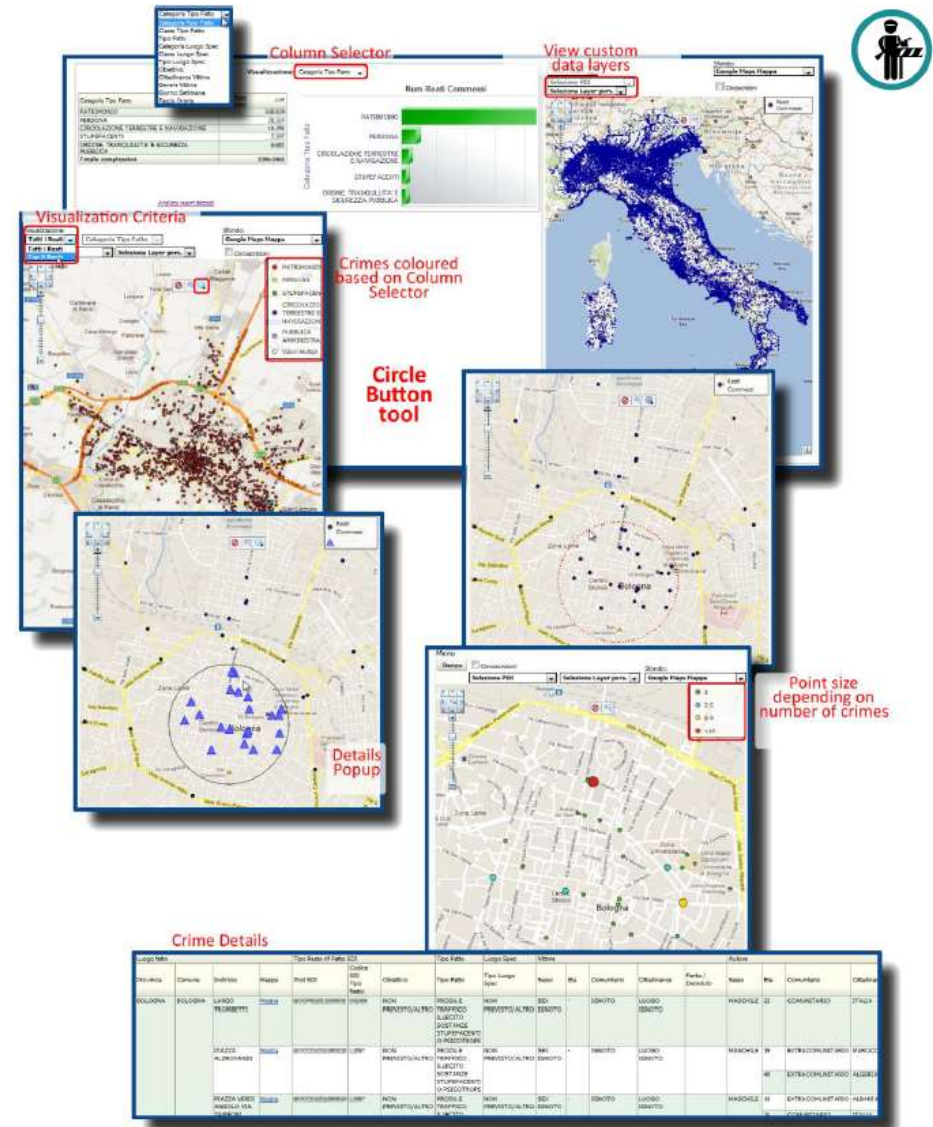
- Ferries
- Private mini-buses
- Shared taxis



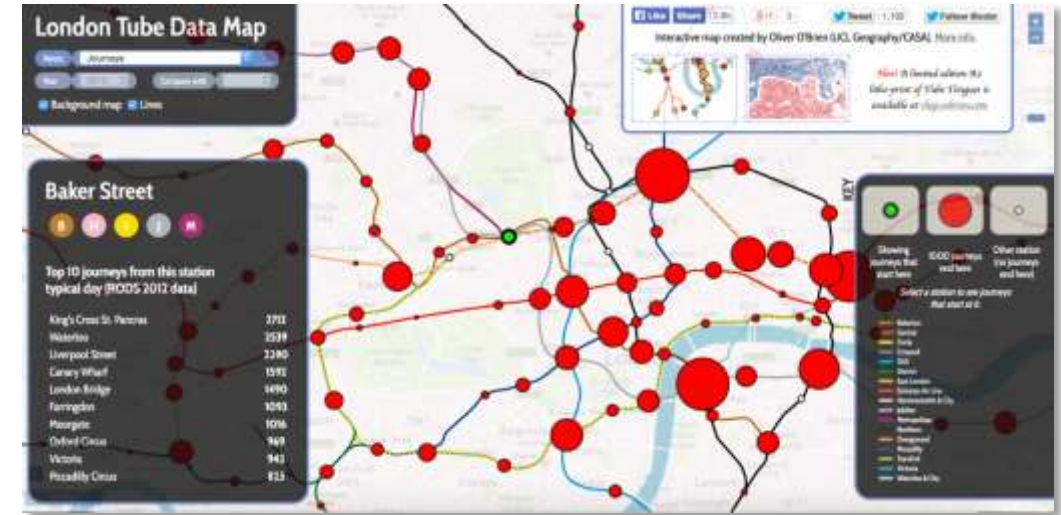
Italian Police / Public Safety

Crime Analysis

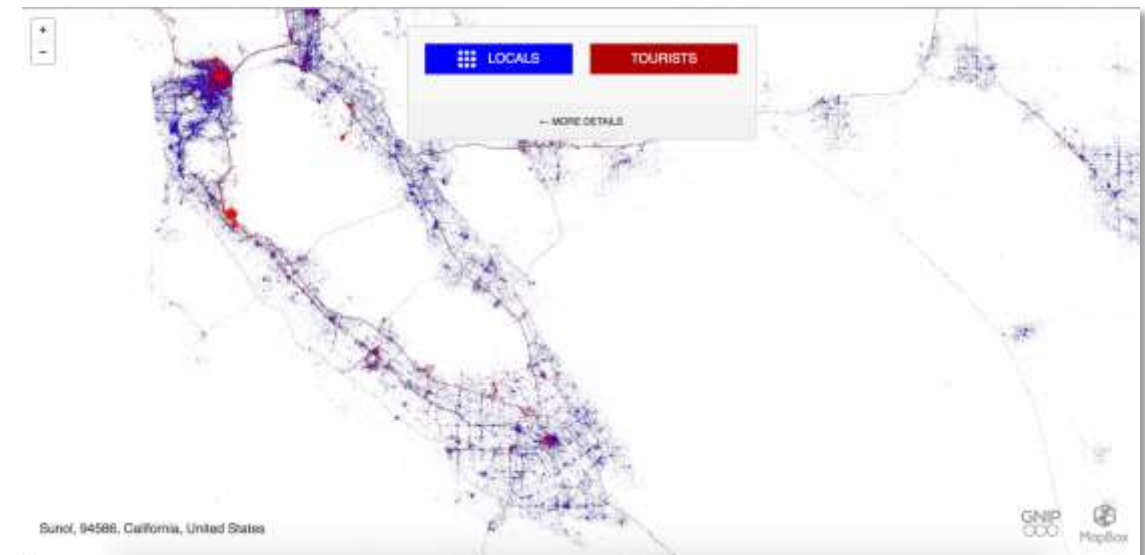
- Overall view of the distribution of a specific crime phenomenon on the territory.
- Prompt filters and Proximity analysis to select the elements and area of interest, with a direct interaction with the map.



Geo-Enrichment, Categorization



- (i) TELCO Wireless network performance (dropped calls, utilization): aggregate and display geocoded Call Data Records, sensor data, other sources for analysis
- (ii) TRANSPORTATION origin-destination analysis: combine transit card/payment info and other sources to determine where (and how many) people travel to, starting from any station on a transit network
- (iii) SOCIAL Geotagged Twitter: where are the tourists and locals tweeting



Location Infused Technology

Java, Databases, BI, Applications, Cloud



WIKIPEDIA
The Free Encyclopedia

Article Talk

Spatial database

From Wikipedia, the free encyclopedia



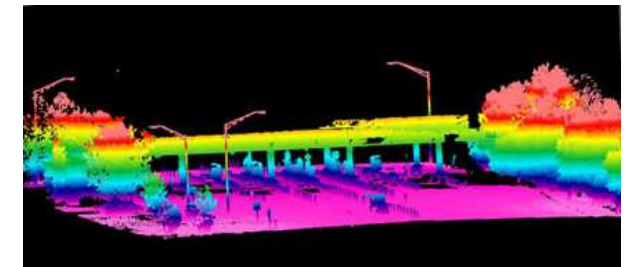
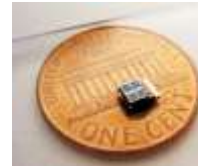
Java and GIS, Part 1: Intro to GIS



Oracle Utilities Mobile Workforce Management

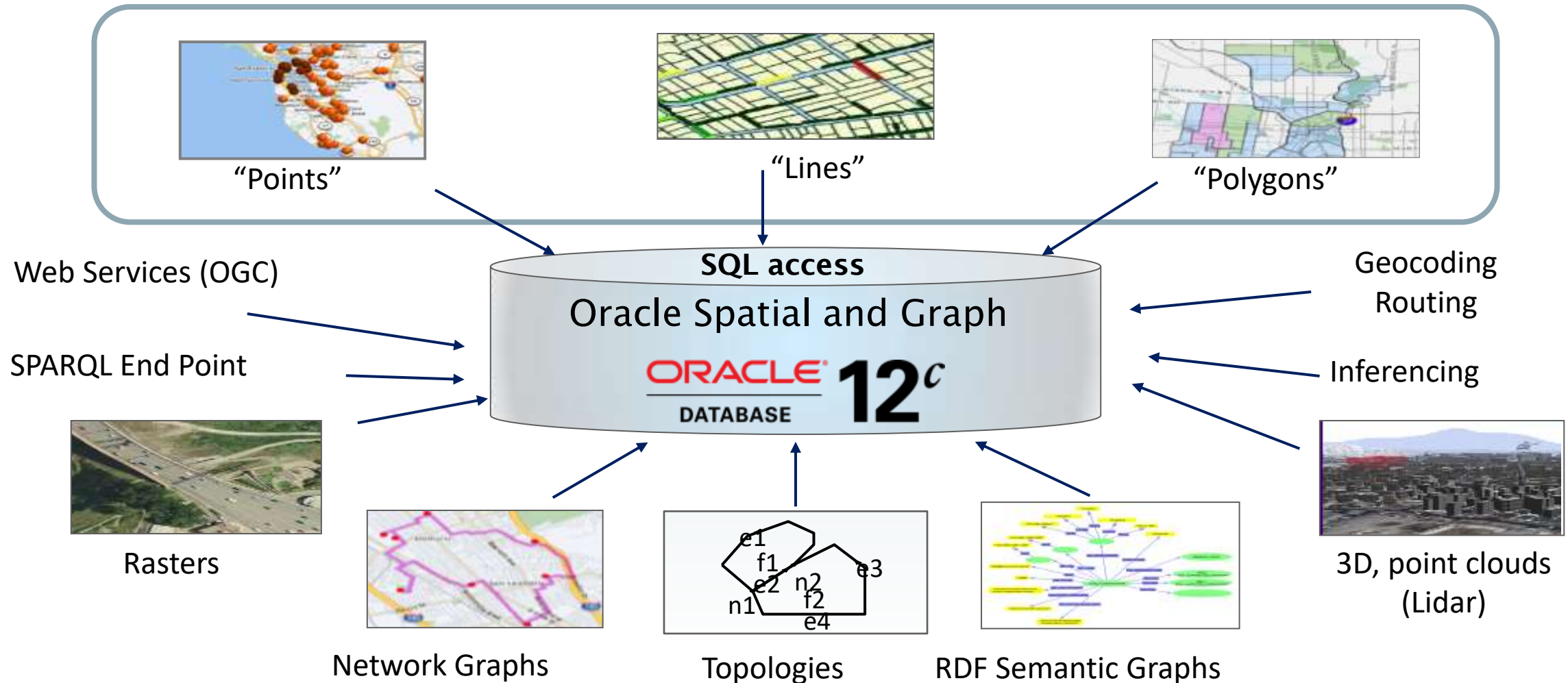
Maximize Workflow Efficiencies and Operational Performance
Oracle Utilities Mobile Workforce Management provides a real-time, end-to-end enterprise solution, enabling utilities to achieve maximum visibility, control, and performance of field resources.
Data Sheet (PDF)

SensorCloud® Live-Connect
Live Streaming Data, Remotely Configure Networks, Change Node Network Settings, Update Firmware
Hardware enables access and bi-directional communication with your wireless sensor network

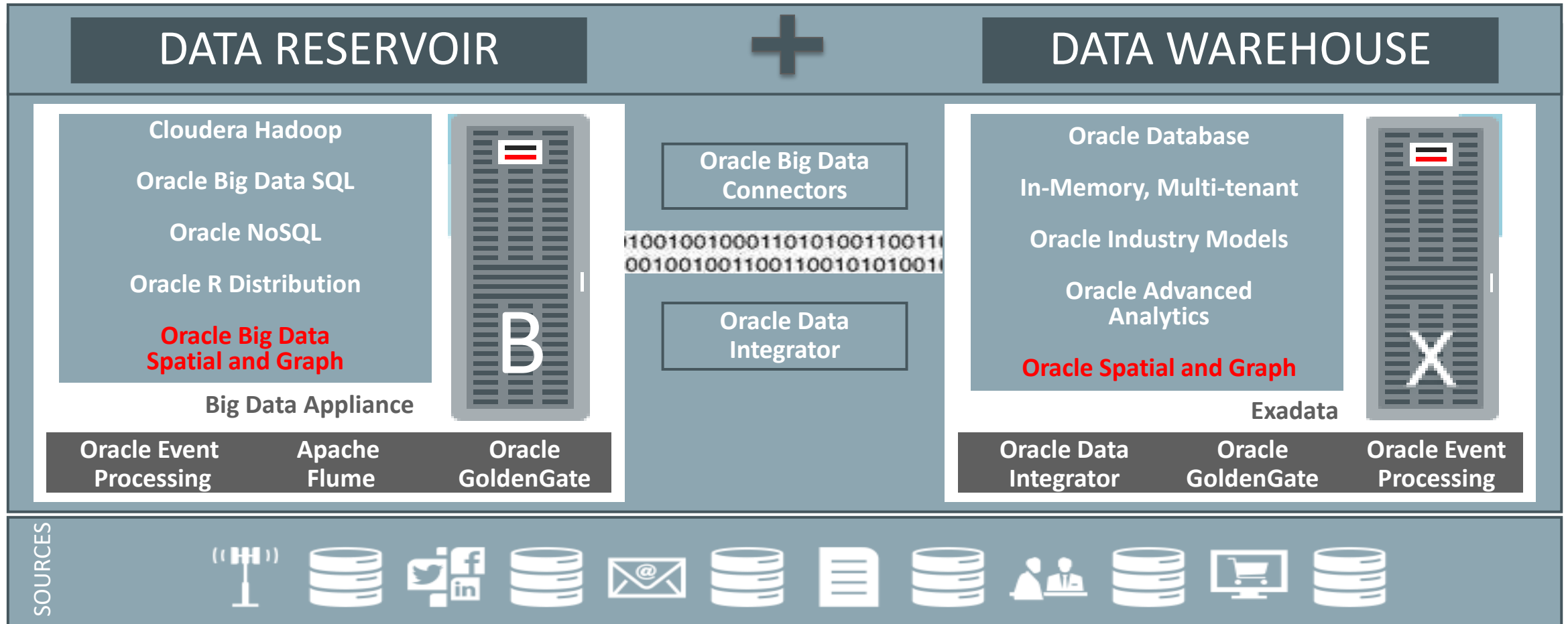


Integrating All Your Spatial Data Types

Bring location analysis and secure storage to enterprise data



The Big Picture – Oracle Big Data Management System



Summary

How to proceed in Smart 3D Cities Efforts

- Leverage existing IT software investments
- Begin to experiment with 3D data sources
- Apply Big Data processes to sensor and social media
- Experiment with open data services
- Use open standards for interoperability
- Test performance, reliability, and security

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